Law Offices
HOLLAND & KNIGHT

A Partnership Including Professional Corporations

2100 Pennsylvania Avenue, N.W.
Suite 400
Washington, D.C. 20037-3202
202-955-3000
FAX 202-955-5564

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September 25, 1996

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PATRICIA Y. LEE
202-457-7110

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FEDERAL COMMUNICATIONS COMMISSION
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Mr. William F. Caton
Acting Secretary
Federal Communications Commission
1919 M Street, N.W.
Room 222
Washington, D.C. 20554

Re: In the Matter of Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems
(CC Docket No. 94-102)

Dear Mr. Secretary:

Transmitted herewith, on behalf of Harris Government Communication Systems Division, a Division of Harris Corporation, are an original and eleven (11) copies of its Comments in the above-referenced docket.

If you have any questions, please do not hesitate to contact me.

Very truly yours,

Patricia Y. Lee
Counsel for Harris Government Communication Systems Division, a Division of Harris Corporation

Enclosures

cc: Ms. Dorothy Conway, FCC; Mr. Timothy Fain, FCC (both by hand)

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**Before the**
**FEDERAL COMMUNICATIONS COMMISSION**
**Washington, D.C. 20554**

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| In the Matter of | ) | |
| Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems | ) | CC Docket No. 94-102<br>RM-8143 |

# COMMENTS OF HARRIS GOVERNMENT COMMUNICATION SYSTEMS DIVISION A DIVISION OF HARRIS CORPORATION

Edward W. Hummers, Jr.
Patricia Y. Lee
Holland & Knight
2100 Pennsylvania Avenue, N.W.
Suite 400
Washington, D.C. 20037
(202) 955-3000

Counsel for Harris Government Communication Systems Division, a Division of Harris Corporation

Art Stewart, Program Manager
Wireless Products and Systems
GCSD, Harris Corporation

September 25, 1996

**Before the**
**FEDERAL COMMUNICATIONS COMMISSION**
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**COMMENTS OF**
**HARRIS GOVERNMENT COMMUNICATION SYSTEMS DIVISION**
**A DIVISION OF HARRIS CORPORATION**

Harris Government Communication Systems Division ("Harris-GCSD"), a division of Harris Corporation, hereby submits its comments in response to the Commission's *Report and Order and Further Notice of Proposed Rule Making*, FCC 96-264, released on July 26, 1996 (hereinafter *"Report and Order"* or *"Further Notice"*), in the above-captioned proceeding.[1]

## I. INTRODUCTION.

1. In the *Report and Order* the Commission adopted E911 system requirements that it believes will optimize the delivery and processing of 911 calls and to prompt the accelerated delivery of enhanced wireless 911 features and functions to administrators of Public Safety Answering Points ("PSAPs"), to assist them in responding to emergency calls for assistance. The Commission made those requirements applicable to all cellular licensees,

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[1] By the Commission's *Order*, DA 96-1405, released on August 21, 1996, the comment date was extended to September 25, 1996.

broadband PCS licensees, and certain Specialized Mobile Radio ("SMR") licensees, collectively referred to as "covered carriers."

2. The Commission stated that the E911 system requirements adopted in the *Report and Order* are a first step towards its goal of improving the availability and quality of 911 service. *Further Notice* at ¶ 13. The Commission added that in view of the Nation's important public safety needs, it must take additional steps to ensure that 911 system performance keeps pace with the latest technologies. Id.

3. In the *Further Notice*, the Commission seeks comments and reply comments on its proposed adoption of additional means of ensuring that wireless E911 continues to benefit from improvements in caller location information ("ALI") technology, while also striving to make sure that covered carriers' development and application of new technologies for E911 services also contribute to the overall quality of service and range of services that carriers provide to all of their customers. Harris-GCSD supports the Commission's recognition of the potential benefits to E911 wireless system performance that can be derived from current ALI technology and technology trends.

4. Harris-GCSD has been a developer of tracking and location systems for the past 12 years. Operating primarily as a government contractor, it has developed numerous custom applications involving ultra-miniature tracking devices in dense urban environments, mobile tracking systems and wide-area tracking and location infrastructures. Terrestrial communications using low power ultra-miniature devices has evolved into a core competency of Harris-GCSD and it has developed many such systems for the federal government. Through the repetitive development of turn key systems in tracking, location and

communications for custom government applications, Harris-GCSD has developed a keen understanding of the effects of body worn device technology, propagation modeling and link margins, low power terrestrial communications and the integration and installation of diverse systems components.

5. Harris-GCSD's most recent tracking and location initiative leverages key technologies and applications developed for the government towards the consumer markets. This new system, which is marketed under the trademark "MicroTrax," provides a miniaturized tracking and location tag that is small enough to conceal in one's pocket and works inside of buildings as well as in urban environments. A unique architectural approach minimizes the complexity of the tracking tag and compensates for this with sophisticated signal processing techniques within the receiver infrastructure. The result is a simple, low cost tracking tag with a position update rate to support true tracking applications as well as emergency notification. MicroTrax is well positioned to address the need to locate a wireless 911 emergency call.

## II. THE COMMISSION SHOULD NOT ADOPT A STANDARD OF 90 PERCENT ACCURACY, WITHIN A RADIUS OF 40 FEET, FOR E911 WIRELESS LOCATION INFORMATION.

6. In the *Report and Order,* the Commission adopted requirements under which covered carriers must supply to PSAPs, not later than five years after the effective date of the rules adopted in the *Report and Order*, information that locates a wireless 911 caller within a radius of 125 meters, using longitude and latitude data, and that provides this degree of accuracy for 67 percent of the 911 calls processed.

7. In the *Further Notice*, the Commission seeks comments on its proposal to adopt more stringent requirements that would require covered carriers to achieve the capabilities necessary to provide to PSAPs, after the initial five-year period, information that locates a wireless 911 caller within a radius of 40 feet, and that provides this degree of accuracy for 90 percent of the 911 calls processed.[2]

8. Harris-GCSD believes that the proposed standard of 90 percent accuracy, within a radius of 40 feet is unrealistic and impractical given the state of the current ALI technology and will remain so for the foreseeable future. The issue of location radius, is less a function of technology than one of infrastructure. In order to achieve a location accuracy of 40 feet, a receiver array would have to be located on virtually every street corner. Such an arrangement, while aesthetically and functionally undesirable, would also be cost prohibitive and exacerbate the already stressed cell siting situation. The 90 percent accuracy rate could be achieved given the current technology by transmitting multiple tracking updates. However, that rate is not realistic within a radius of 40 feet. Instead, Harris-GCSD recommends that the Commission adopt a dual location standard of 90 percent accuracy, within a radius of 200 feet, and 67 percent accuracy, within a radius of 150 feet.

## III. THE COMMISSION SHOULD ADOPT AN OUTBOARD SYSTEM FOR PROVIDING E911 WIRELESS LOCATION INFORMATION.

9. Based on the *Report and Order*, it appears that the covered carriers would have to modify the existing wireless communication infrastructure in order to provide E911 location information service.

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[2] While vertical location is achieveable, it would be an unduly costly requirement that would not likely survive a cost/benefit analysis.

10. Harris-GCSD believes that the Commission's suggested *ad hoc* approach to providing ALI will result in inconsistent and inferior E911 service by the various covered carriers. Because multiple standards and formats exist in wireless communication (i.e., PCS, Cellular, SMR, CDMA, AMPS, etc.), a variety of different approaches for processing ALI from these communication channels, and consequently unnecessary costs and variable quality of service, are likely to evolve.

11. Also, Harris-GCSD believes that it would be unnecessarily expensive and inefficient for covered carriers to incorporate ALI technology into their existing infrastructure that was developed for communication. The current towers and spectrum for wireless communication are optimized for communication, not for ALI. Modification of the existing wireless communication infrastructure to provide ALI in addition to communication would compromise both services. Harris-GCSD believes that the Commission's *ad hoc* approach places an unnecessary burden on covered carriers and essentially forces providers of communications into a business, location information service, with which they have little familiarity or expertise.

12. Finally, Harris-GCSD submits that the Commission's *ad hoc* approach could not be developed and integrated into the wireless communication infrastructure within 5 years, as required by the *Report and Order.*

13. Instead, Harris-GCSD recommends that the Commission explore ways to utilize the existing location information service infrastructure and proven location information technology to provide E911 wireless location information. The location service towers and spectrum are optimized for ALI. Thus, integration of the existing location

service infrastructure and technology with the existing wireless communication infrastructure and technology will result in optimal E911 wireless location service. It will also permit the enhanced development of a location service that will be useful to members of the public beyond those who subscribe to wireless telephone service.

14. Accordingly, Harris-GCSD recommends that the Commission adopt minimum standards for outboard systems to provide location information and require each of the covered carriers to integrate an outboard system into its existing wireless communication service. An outboard system that is developed by location information providers, working in conjunction with communication service providers, will produce the most advanced, effective and cost efficient E911 wireless ALI.

15. A location processing system that is entirely outboard of existing communication services would provide numerous advantages. First, the location processing overlay would be optimized for location accuracy through utilization of dedicated location processing spectrum in the 902-928 MHz band, thereby avoiding communication channel interference or infringement on capacity. Second, compatible outboard systems would result in consistent E911 system performance across the various wireless communication technologies. That is, an outboard approach would enable cellular, PCS and SMR services to provide the same high quality E911 service. Finally, a uniform outboard location processing system could be integrated into wireless communication within 5 years.

16. Based on its experience with tracking and location systems, Harris-GCSD recommends the use of a small, low power transmit-only type beacon that could be integrated into any wireless communication device. The simplicity of a keyed transmitter

would be low cost and permit miniaturization. The keyed transmitter could either be integrated into the phone or integrated into battery packs that would permit upgrade paths to existing units.[3] The device would be keyed either manually through a push button or automatically whenever 911 is dialed. The transmission would be received by multiple dedicated receivers that utilize multilateration techniques over dedicated frequencies in the LMS band. Because the waveform and receiver infrastructure has been optimized for location processing, the 67 percent accuracy, within a radius of 125 meters, required by the Commission's five year plan is easily attainable. The position of the emergency transmission would be calculated at the location provider's operations center and routed to the appropriate PSAP. A unique identification number within the transmitting beacon allows the PSAP to couple location with the 911 voice call. Importantly, because this location beacon does not rely on the communication channel or communication device, it adds a layer of redundancy to the emergency notification. Once triggered, multiple beacon transmissions provide position location reliability and accuracy as well as tracking capability.

17. Harris-GCSD believes that one of the most compelling reasons for the outboard solution to E911 through a location service provider will be in the cost savings that accrues to the general public, who will ultimately subsidize this emergency service. Because location providers will be serving additional market segments to E911, they will be able to amortize their costs over a broader base. These savings, in turn, will be passed onto individual users of wireless communication. Further, the wireless providers will not have to incur additional costs for ALI service of comparable quality to that provided by location

[3] Once a 911 call is initiated, the emergency location beacon begins at a rate of once per second for a programmable duration.

service providers. Ultimately, the use of an outboard location processing system, with its proven technology, will result in better performance, higher accuracy, and more cost efficient service for consumers.

18. The Commission should adopt minimum standards for an E911 outboard system and require covered carriers to integrate into their communication services an outboard system that meets those standards. Harris-GCSD recommends that the Commission adopt the following minimum technical requirements for the E911 outboard system:

a. Highly miniaturized: $< 1.44$ in$^3$ and $< 1.2$ ounces;

b. Response time: location information must be available to the PSAPs within 5 seconds of the initiation of the 911 voice call;

c. High system capacity: $>$ 20,000 locates/minute/cell;

d. System availability: .9999;

e. Signal detection probability: 99.99%;

f. Reliable operation in buildings and in cars;

g. The emergency 911 location beacon shall be asynchronous to the receiving infrastructure;

h. The emergency 911 location beacon shall work independently of the communication device and channel, allowing the emergency locator to operate when the communication device is inoperable;

i. Each emergency 911 transmitter must have a unique identification code;

j. The emergency 911 transmitter link must provide 10dB more margin than its associated communication channel; and

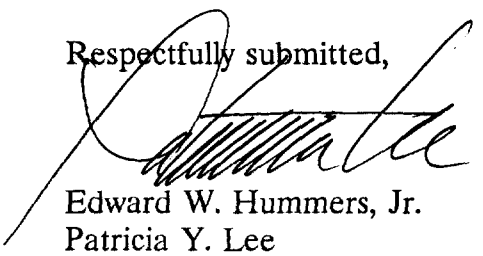
k. Location accuracy: 90 percent accuracy, within a radius of 200 feet, and 67 percent accuracy, within a radius of 150 feet.

19. Harris-GCSD urges the Commission to investigate the potential benefits of involving location services providers in its quest to improve the availability and quality of wireless E911. As detailed above, an outboard approach to E911 wireless location service would provide numerous advantages in system performance, result in minimal impact to existing wireless infrastructure and be the most cost efficient alternative.

## IV. CONCLUSION.

For all these reasons, the Commission should adopt (1) a dual location standard of 90 percent accuracy, within a radius of 200 feet, and 67 percent accuracy, within a radius of 150 feet, and (2) a minimum standard for outboard ALI systems for E911 and require their implementation by covered carriers.

Respectfully submitted,



Edward W. Hummers, Jr.
Patricia Y. Lee
Holland & Knight
2100 Pennsylvania Avenue, N.W.
Suite 400
Washington, D.C. 20037
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